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Metabolism of the extracellular matrix in bronchial asthma (Review)

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Abstract

 Bronchial asthma is associated with upper airway (UA) disorders, primarily with allergic rhinitis, which, in turn, occurs in combination with other UA conditions, including hyperplasia of the nasal mucosa. Chronic rhinosinusitis, if confirmed, is a predictor of asthma severity. The pathogenesis of these diseases includes the remodeling (restructuring) of the extracellular matrix and the adjacent UA structures, which is associated with further worsening of the diseases and their resistance to therapy. It is known that remodeling of the lower respiratory tract in bronchial asthma is characterized by epithelial desquamation, hyperplasia of goblet cells, thickening of the basement membrane, fibrosis of the subepithelium, hyperplasia of smooth muscles of the respiratory tract, and increased angiogenesis. At the same time, the UA remodeling in patients with asthma is still poorly understood; the data are still limited and often contradict each other. With isolated allergic rhinitis, the remodeling process is not very much pronounced and is limited, apparently, to a basement membrane thickening. In chronic rhinosinusitis, the UA remodeling manifests by epithelial hyperplasia and an increased sedimentation and degradation of the matrix along with the accumulation of plasma proteins. Despite recent extensive studies, the cellular and molecular mechanisms involved in the respiratory tract remodeling remain largely undetermined, which necessitates further research into these processes. The review addresses several aspects of neuro-humoral control of the extracellular matrix metabolism and the associated remodeling of the upper and lower airway in patients with asthma.

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Keywords

Allergic rhinitis, Bronchial asthma, Chronic rhinosinusitis, Extracellular matrix, Remodeling

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